Intensity Monitoring in NuMI and the Booster Neutrino Beam

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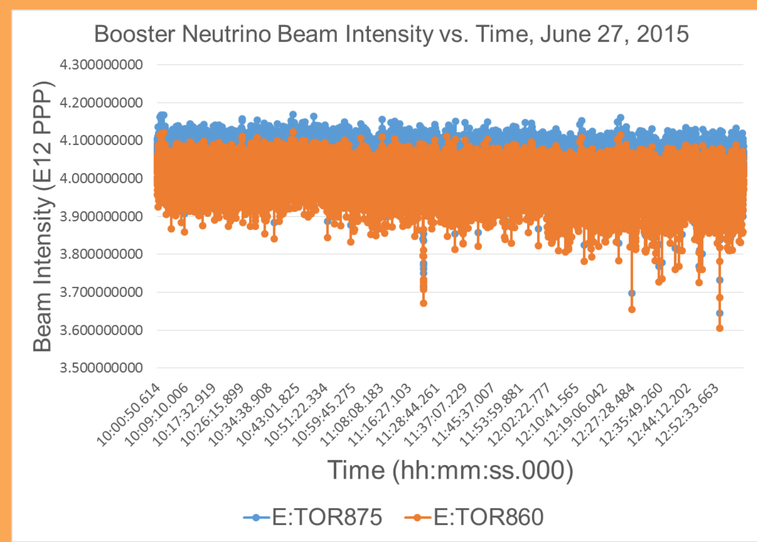
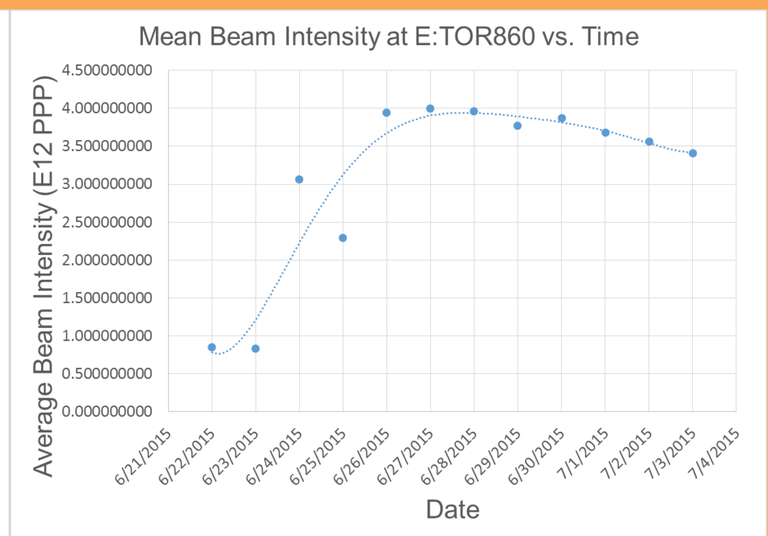
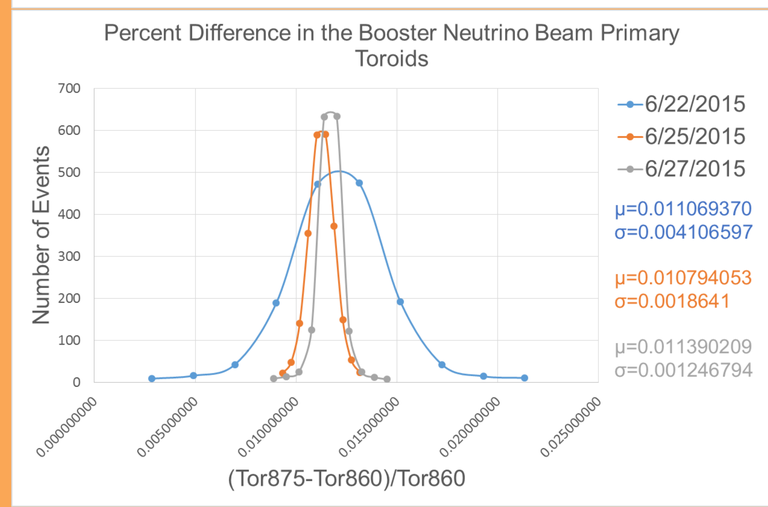
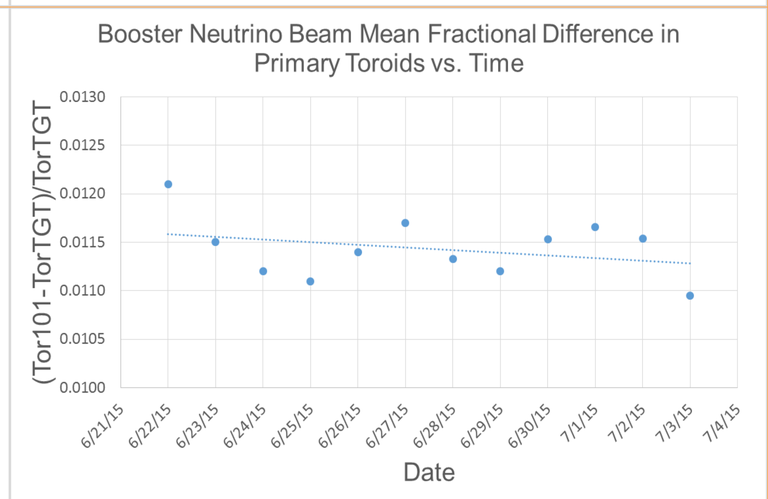
Intensity in the Booster Neutrino Beam Primary Toroids

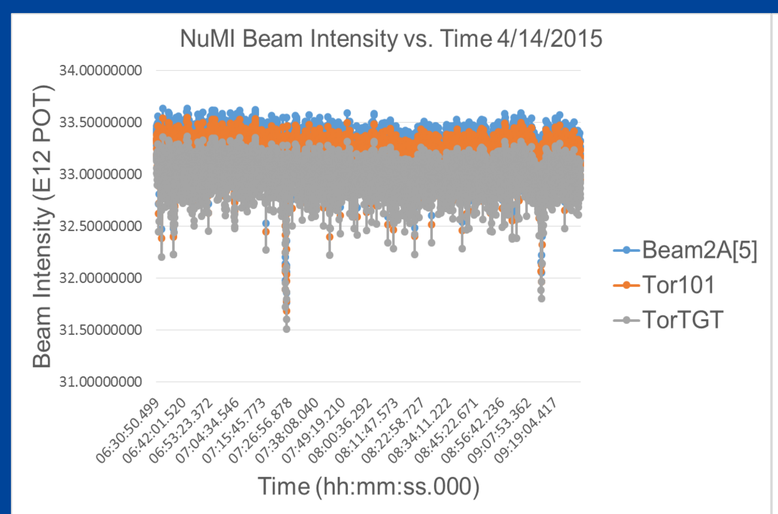
- The Booster Neutrino Beam (BNB) receives beam directly from the Booster.
- It will provide neutrinos for the MicroBooNE experiment.
- Stability of the BNB is monitored through two toroids along the primary proton beamline, E:TOR860 and E:TOR875.
- By monitoring the intensity in these toroids, it was determined that there is an average 1.1% difference in measured intensity in the toroids.
- Interestingly, the downstream toroid is measuring a higher intensity than the upstream toroid. However, the BNB can't be picking up extra protons along the way.
- This is likely due to a calibration error, and the toroids are due to be recalibrated.

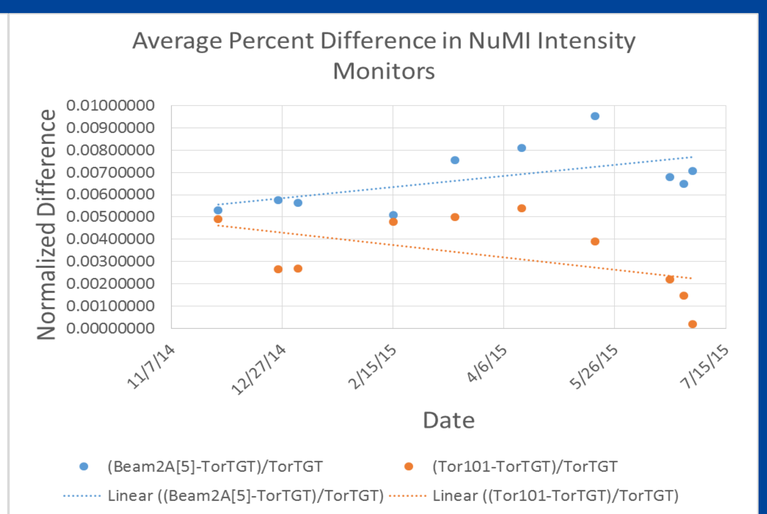


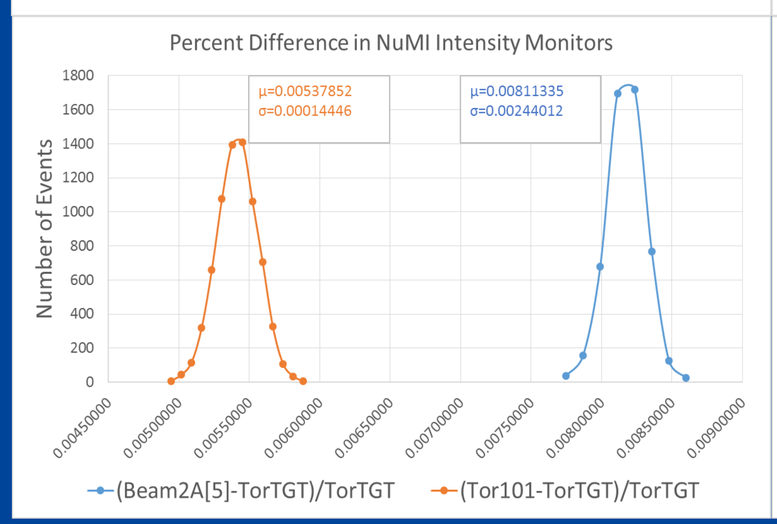


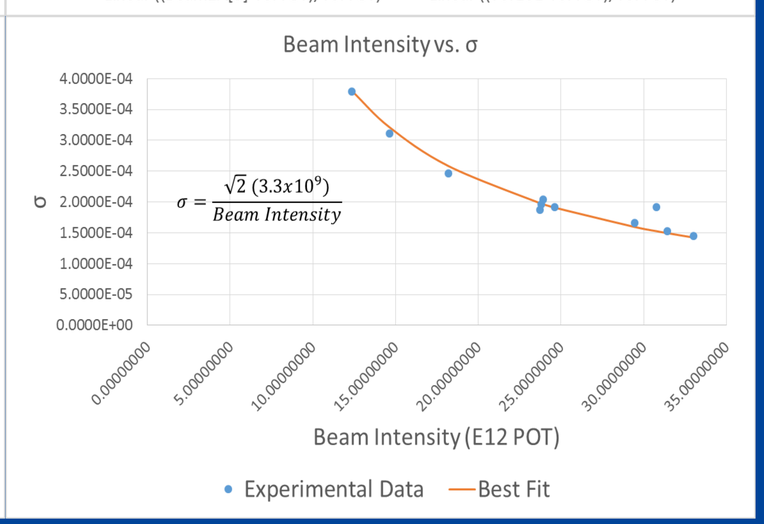












Intensity in the NuMI Beam Primary Toroids

- The NuMI Beam receives beam directly from the Main Injector.
- NuMI provides neutrinos for the MINOS, MINERνA, and NOνA experiments.
- Main Injector intensity is monitored in the Direct Current Beam Current Transformer, I:BEAM2A[5].
- NuMI Beam intensity is measured through two toroids along the primary proton beam, E:TR101D and E:TRTGTD.
- Average difference of approximately 0.5% between the toroids and 0.8% between Beam2A[5] and TorTGT
- This data is consistent with the noise in the toroids of approximately protons.

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